

Chronic Gastric Volvulus: Is it a Missed Cause of Gastro-Esophageal Reflux in Children? A Single Institution Study

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Abstract

Introduction: Gastric volvulus is a rare clinical entity in the pediatric population. Recently, chronic gastric volvulus (CGV) is being diagnosed with increasing frequency. The treatment of CGV and associated gastro-esophageal reflux disease (GERD) may be medical or surgical depending on the underlying etiology.

Aim: The objective of our study was to investigate whether CGV is a common cause of GERD in our locality.

Material and Methods: This is a retrospective study carried out during the period from October 2016 to November 2018. The study included all patients who were neurologically normal and had clinical picture suggesting GERD. All patients were investigated for GERD by doing upper GIT contrast study.

Results: The total number of patients was 60 patients (38 males and 22 females). Their age at presentation ranged from 3 days to 7 years old (mean; 5.2 months). Twenty-six (43.3%) patients were premature. The mean birth weight was 2233gm. Upper GIT study revealed that 27 cases (45%) had volvulus whereas 33 cases (55%) did not have volvulus. GERD was diagnosed in 36 cases (60%) and was not detected in 24 cases (40%). Twenty (55.5%) of GERD positive patients had CGV.

Conclusion: CGV is not uncommon and usually underdiagnosed cause of GERD in neonates and infants. The possibility of primary or secondary CGV should be considered in the differential diagnosis of any patient with manifestations of GERD.

Keywords: Neonatal Vomiting; Postprandial Vomiting; Chronic Gastric Volvulus; GERD

Abbreviations

GV: Gastric Volvulus; CGV: Chronic Gastric Volvulus; GERD: Gastro-Esophageal Reflux Disease; GIT: Gastrointestinal Tract; ATLEs: Apparent Life-Threatening Events; NPO: Nothing Per Oral

Introduction

Gastric volvulus (GV) is a rare clinical entity in the pediatric population [1-3]. It is defined as an abnormal rotation of the stomach for more than 180° [1]. GV is classified, according to the axis around which the stomach rotates, into three types: Organoaxial, Mesenteroaxial or Combined [3]. GV is either Idiopathic or secondary to congenital anatomical defects [4]. In neonates and young infants, laxity of the gastric ligaments, owing to organ immaturity, and a disproportionately large cardia and fundus are common findings that predispose to idiopathic GV [5]. In children, GV could be acute or chronic. Acute GV is frequently associated with other anatomic defects, such as a diaphragmatic hernia or eventration, para-esophageal hernia or congenital asplenia [3]. In contrast, chronic gastric volvulus (CGV) is predominantly idiopathic [1,6]. Recently, CGV is being diagnosed with increasing frequency. This is attributed to the increasing use of contrast

study for evaluation of infants and children with abdominal distension, repeated attacks of vomiting and recurrent respiratory infection to exclude gastro-esophageal reflux diseases (GERD) and exclude the presence of associated upper GIT anomalies [1,7]. The diagnosis of CGV requires a high index of suspicion and a confirmatory upper gastrointestinal contrast study [1,8,9].

The treatment of CGV and associated GERD may be medical or surgical depending on the underlying aetiology [7,10,11].

Patients and Methods

This is a retrospective study carried out during the period from October 2016 to November 2018. The study included all patients (60 Patients) who were *neurologically normal* and had clinical picture suggesting GERD or unexplained feeding intolerance. All patients were investigated for GERD by upper GIT contrast study. The diagnosis was Organoaxial GV if the study showed rotation of the stomach along its longitudinal axis, with the greater curvature positioned above and to the right of the lesser curvature and pylorus oriented downward (Figure 1 and 2). However, when the stomach rotated along its short axis, with consequent displacement of the antrum above the gastro-esophageal junction; this was diagnosed as mesenteroaxial GV (Figure 3) [12].



Figure 1: Plain abdominal radiograph shows hugely distended stomach with the pylorus directed downwards (arrow).

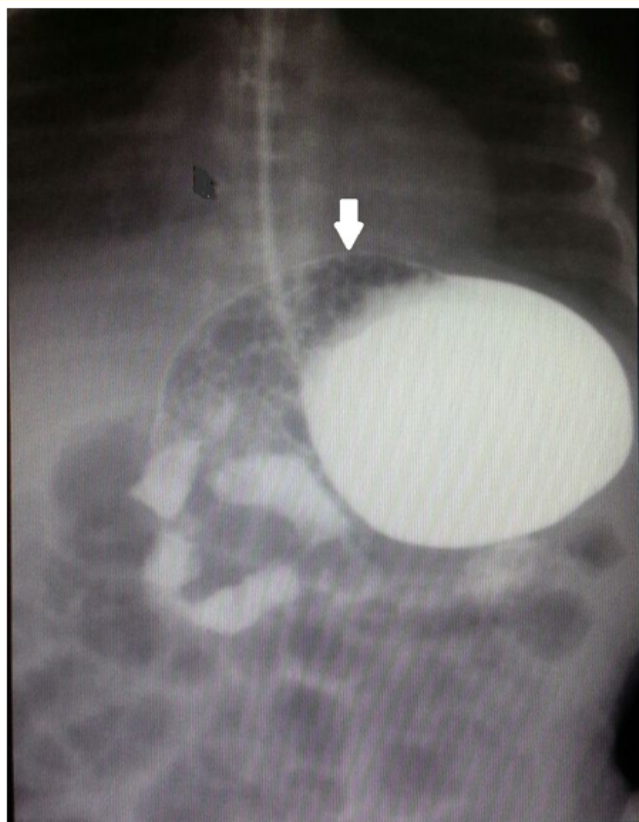


Figure 2: Upper gastrointestinal series showing reversal of the greater curvature (arrow) and lesser curvatures

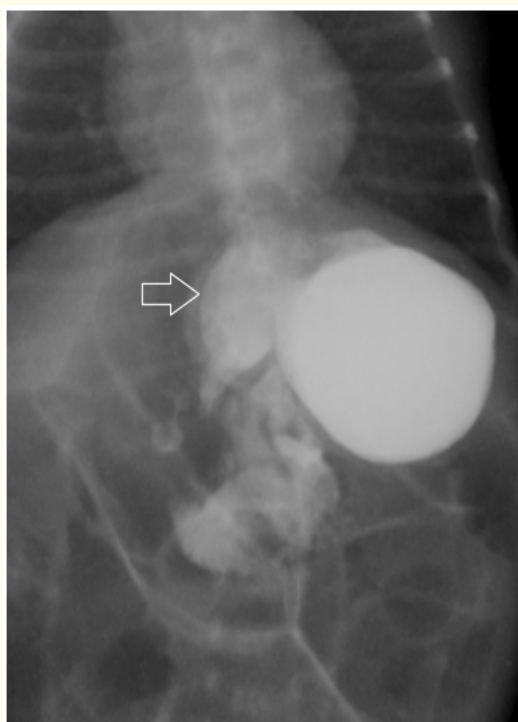


Figure 3: Upper gastrointestinal series showing displacement of the antrum (arrow) above the gastro-esophageal junction denoting mesentero-axial GV.

The objective of our study was to investigate whether CGV is a common cause of GERD in our locality. The study was granted preliminary approval by our Institutional Ethical Committee. Data about the gestational age, age at presentation, sex, birth weight, symptoms and signs, radiological findings and the modality of management were collected, tabulated and statistically analyzed by SPSS (program statistical package for social science) version 22 (Armonk, NY: IBM Corp).

The data were described in the form of the mean (+/-), SD for quantitative data and Frequency and proportion for Qualitative data. The normality of distribution was tested by Kolmogrove-Smirnov test and Shapiro Walk test. All continuous data were parametric and normally distributed. ANOVA test and CHI-SQUARE test were used for analysis of variables. OR [odds ratio] and 95% confidence interval was calculated to detect risk of occurrence of volvulus. P value was significant if ≤ 0.05 at confidence interval 95%.

Results

The total number of patients was 60 patients (38 males and 22 females). Their age at presentation ranged from 3 days to 7 years old (mean; 5.2 months). Twenty six (43.3%) patients were premature. The mean birth weight was 2233 gm (Table 1, 2, 5). The clinical presentations were: respiratory signs that varied from recurrent attacks of apnea, cyanosis and desaturation (53.3%) to recurrent apparent life-threatening events (ALTEs) (1.6%), non-bilious vomiting and regurgitation (25.0%) with or without upper abdominal distension and high gastric residual (11.7%) (Table 3).

Gender	Number	%
Males	38	63.3%
Females	22	36.7%

Table 1: Gender.

Gestational age (weeks)	Mean \pm SD	Minimum	Maximum
	35.4 \pm 4.1	24	40
Birth wt. (gm.)	2233 \pm 818	595	4700
Age at time of study in (months)	5.2 \pm 14.2	0.1	84

Table 2: Characters of the studied groups.

		Number	%
Radiological reflux	Yes	36	60%
	No	24	40%
Presentation	Desaturations, cyanosis, apnea	32	53.3%
	ALTEs*	1	1.6%
	Increased gastric residuals, abdominal distention	7	11.7%
	Vomiting regurgitation	15	25%
	Others ¹	6	10%
Co morbidities	None	24	40%
	Premature	26	43.3%
	GIT anomalies**	1	1.7%
	Others ²	9	15%

Table 3: Clinical presentation and comorbidities.

*: ALTEs, apparent life-threatening events. **: Malrotation, ¹: Hematemesis, failure to establish oral feeding.

²: Associated non-neurological syndromes.

GERD was diagnosed in 36 cases (60%), twenty (55.5%) of them had CGV. The remaining 24 patients had no GERD; nevertheless, 7 of them had CGV (Chart 1). The total number of CGV was 27 cases (25 organoaxial, 2 mesenteroaxial) (Table 4).

		Volvulus		Total	P	OR [95%CI]
		Positive	Negative			
Radiological reflux (GER)	Yes	20	16	36	0.044	3.03, (95%CI: 1.01 - 9.10)
		55.5%	44.5%			
	No	7	17	24		
		29.2%	70.8%			
Total		27	33	60		

Table 4: Relation between radiological reflux and chronic gastric volvulus. There is significant association between volvulus and reflux with increased risk, 3 folds, of occurrence of reflux in the presence of associated volvulus.

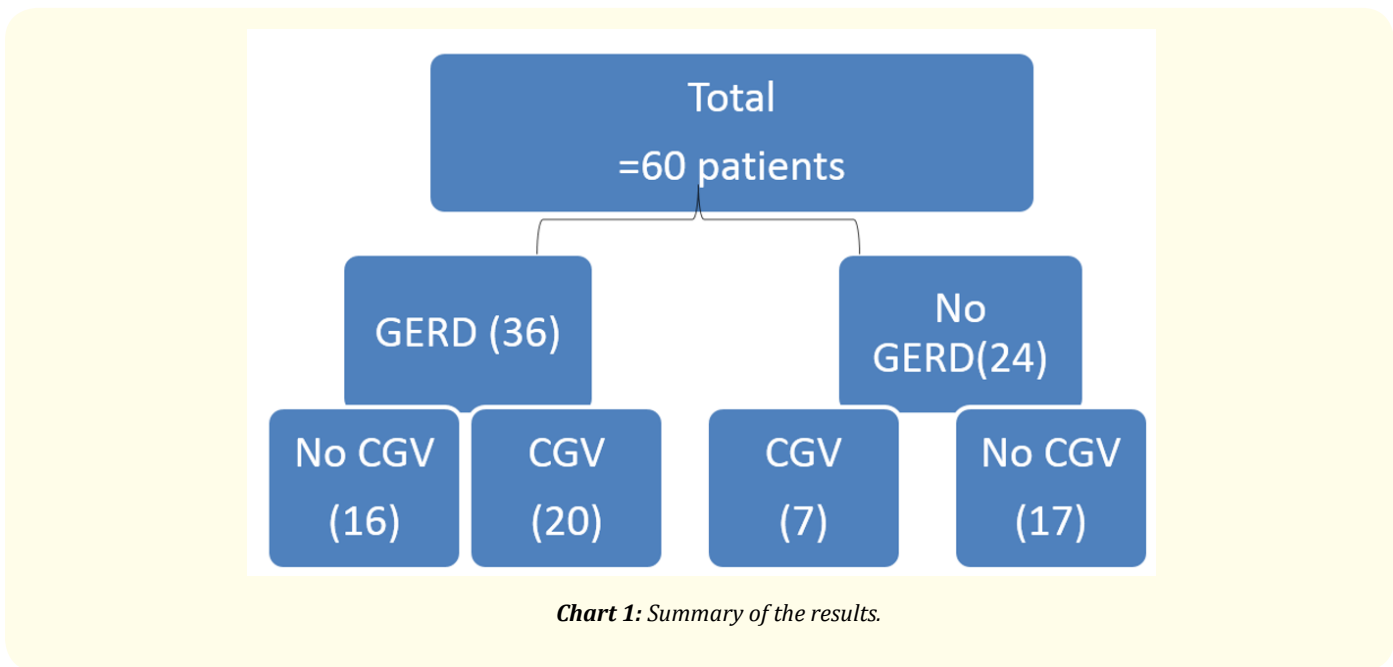


Chart 1: Summary of the results.

All patients with CGV did not have associated congenital GIT anomalies except one who had malrotation (Table 3).

Twenty-five CGV patients were treated successfully with conservative management. However, two patients were operated (1 malrotation and 1 recurrent ALTEs) (Table 5).

			Volvulus		Total	P	
			Positive	Negative			
ttt	None	Count	6	12	18	0.34	
		% within volvulus	22.2%	36.4%	30.0%		
	AR formula	Count	11	16	27		
		% within volvulus	40.7%	48.4	45.0%		
	Medications	Count	8	5	13		
		% within volvulus	29.6%	15.2%	21.7%		
	Surgery	Count	2	0	2		
		% within volvulus	7.4%	.0%	3.3%		
	Total		Count	27	33		60
			% within volvulus	100.0%	100.0%		100.0%

Table 5: Relation between volvulus and mode or treatment. There is no significant difference regarding the way of treatment of volvulus.

Discussion

CGV is a disease of recurrent non-specific symptoms in the absence of immediate life-threatening complications [12]. It is being diagnosed with increasing frequency due to liberal use of contrast meal for evaluation of infants and children with repeated attacks of vomiting and recurrent chest infection [1,7]. These findings support our results in which 27 patients (45%) of our cases were accidentally discovered of having CGV during the routine investigation for GERD (Table 4). The incidence of CGV in our study is higher than others and this could be attributed to many factors specific to our region. First, the higher birth rate due social and religious aspects. Second, high rate of preterm babies who could be accommodated and managed properly because of the availability of suitable number of incubators and the proper resources. The aim of our study was to investigate whether CGV is a common cause of GERD in our region or not. Statistical analysis of our results revealed a significant association between GERD and CGV (p value of = 0.044). Radiological signs of GERD were detected in 36 (60%) patients, 20 (55.5%) of them had CGV. The remaining 24 patients (out of 60) had no radiological signs of reflux, nevertheless, 7 (29.1%) of them had radiological signs of CGV. Statistical analysis of our results revealed that the relative risk of occurrence of GERD increased by 3 folds in the presence of CGV [OR was 3.03 at confidence interval 95%] (Table 4). We cannot make a generalization about our results because of the limited data available from the review of the literature about the relation between pediatric CGV and GERD and the restriction of this study to our locality. However, Danzil and Patel clearly cited that GERD with esophagitis is among the most common complications of CGV [13,14].

Neonates and young infants are more liable to have idiopathic gastric volvulus due to laxity of the gastric ligaments, owing to a general organ immaturity, and a disproportionately large cardia and fundus [5]. In our results 43.3% of our cases were premature. Although the statistical analysis of our results showed no significant association between volvulus and prematurity, still our results supports the fact that there is increased risk of occurrence of CGV in premature patients [OR was 2.9803 at confidence interval 95%] (Table 6).

		Volvulus		Total	P	OR [95%CI]
		Positive	Negative			
Prematurity	Premature	15 55.6%	11 33.3%	26	0.054	2.98 [0.67: 7]
	No	12 44.4%	22 66.7%	34		
Total		27	33	60		

Table 6: Relation between prematurity and volvulus.

There is no significant association between volvulus and prematurity but there is increased risk of occurrence of CGV with prematurity OR [95%CI] = 2.98 [0.67: 7].

Woo., *et al.* cited that gastric and colonic distension, especially the transverse colon, are an important predisposing factors for the occurrence of CGV [2]. In our study, we observed that oxygen therapy in preterm babies via a face mask is an important predisposing factor for the occurrence of idiopathic CGV because it usually results in aerophagia with subsequent gastric and colonic distension.

In our series, 27 patients had CGV. Twenty-five patients had idiopathic CGV which were managed conservatively (NPO, insertion of big OGT for continuous gastric decompression, colonic decompression with rectal glycerin suppository) with watchful observation. In contrast, 2 patients were surgically corrected with anterior gastropexy (Table 5). These results are similar to others who have reported successful conservative treatment in patients with idiopathic CGV and concluded that those with mild to moderate symptoms should be treated conservatively because the clinical outcome is uneventful [7,11]. Federica, stated that 40% of infants with CGV are treated successfully with conservative management with a subsequent spontaneous improvement of symptoms [2].

Conclusion

CGV is not uncommon and usually underdiagnosed cause of GERD in pediatrics. The possibility of primary or secondary CGV should be considered in the differential diagnosis of any patient with manifestations of GERD. Over-distension of the stomach and colon should be avoided during oxygen therapy because it is an important factor that initiates the process of gastric volvulus especially in premature predisposed babies. We believe that more studies are needed in other centers to support our results.

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